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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,796	10/16/2003	Kazuto Ikeda	032016	7017

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EXAMINER

VERSTEEG, STEVEN H

ART UNIT PAPER NUMBER

1753

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/685,796

Applicant(s)

IKEDA, KAZUTO

Examiner

Steven H. VerSteeg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-15 is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/16/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **110** (see page 17 at line 16). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Allowable Subject Matter

2. Claims 1-15 are allowed.

3. The following is an examiner's statement of reasons for allowance: it is neither anticipated nor obvious over the prior art of record to have a method of manufacturing a semiconductor device as claimed by Applicant in claims 1 and 15.

4. JP 11-233456 (JP '456) discloses all the limitations of claims 1 and 15 except that the temperature that the substrate is heated to is 300-500 Celsius [0009] when the cobalt layer is formed.

5. JP 11-111642 (JP '642) discloses all of the limitations of claims 1 and 15 except that the substrate temperature for forming the cobalt film is 400-500 Celsius [0027].

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6. *A New Cobalt Salicide Technology for 0.15 μ m CMOS Using High-Temperature*

Sputtering and In-Situ Vacuum Annealing by Inoue et al. (Inoue) discloses the limitations of claims 1 and 15 except that the temperature of the substrate when forming the cobalt film is from room temperature to 450 Celsius.

7. *Leakage Mechanism and Optimized Conditions of Co Salicide Process for Deep-*

Submicron CMOS Devices by Goto et al. (Goto) discloses the limitations of claims 1 and 15 except that the substrate temperature for the cobalt deposition is neither disclosed nor suggested.

8. US 5,874,342 to Tsai et al. (Tsai) discloses forming a salicidation process as claimed by Applicant except that the substrate temperature during deposition of the cobalt layer is about 20 to about 300 Celsius (col. 5, l. 12-16).

9. US 2003/0029715 A1 to Yu et al. (Yu) discloses a salicide process as claimed by Applicant except that the temperature of the substrate during the cobalt deposition is about 10 to about 500 Celsius [0068].

10. US 6,864,143 B1 to Shue et al. (Shue) discloses a salicide process as claimed by Applicant except that the substrate temperature when depositing the cobalt layer is 25-500 Celsius (col. 7, l. 41-45).

11. Thus, JP '456, Inoue, Tsai, Yu, and Shue each disclose a temperature range that encompasses the range claimed by Applicant. JP '642 and Goto disclose a temperature range greater than that claimed by Applicant. In each case, one of ordinary skill in the art might initially say that a temperature range claimed by Applicant would be obvious because either the range is encompassed (in the case of JP '456, Inoue, Tsai, Yu, and Shue) or close to (in the case of JP '642 and Goto) the range taught by the references. However, when one looks to the

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specification, it is clear that Applicant's claimed range of 330 to 395 Celsius is not an arbitrarily selected range. Applicant has shown in that at a temperature below 330 Celsius, the leak current will be higher and not at a good level (see page 13). Applicant has also shown that if the substrate temperature is 400 Celsius or higher, the climb-up of silicide will be a problem (see page 16). When both the climb-up and leak current are considered together, Applicant has shown that unexpected results occur for a temperature range of 330-395 Celsius (see page 16). The unexpected results means that Applicant's claimed temperature range is not obvious.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

General Information

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (571) 272-1700.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Denis Boyd at (571) 272-0992.

For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (571) 272-1300.

Conclusion

12. This application is in condition for allowance except for the formal matters mentioned above.

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Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. VerSteeg whose telephone number is (571) 272-1348. The examiner can normally be reached on Mon - Thurs (6:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Steven H VerSteeg
Primary Examiner
Art Unit 1753

shv
June 24, 2005